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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/644,634	08/23/2000	Kanu G. Shah	60680-1407	1464

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EXAMINER
BISSETT, MELANIE D

ART UNIT	PAPER NUMBER
1711	10

DATE MAILED: 06/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/644,634	SHAH ET AL.	
	Examiner	Art Unit	
	Melanie D. Bissett	1711	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 March 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-50,52-57 and 59-61* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *39-45,60 and 61* is/are allowed.

6)☒ Claim(s) *1-38,46,47,49-50,52-54,56,57 and 59* is/are rejected.

7)☒ Claim(s) *48 and 55* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. The rejections based on 35 USC 102 and 35 USC 103 have been withdrawn based on the applicant's amendment. Also, the rejection based on 35 USC 112 has been withdrawn. Upon reconsideration, a new rejection for at least claim 46 has been included with the present Office action. Also, new rejections for independent claims 1 and 22 have been included as necessitated by amendment.

2. It is noted that, upon the applicant's suggestion, the examiner has considered the prior art found in related application 09/644,316. It is the examiner's position that the Watariguchi reference (US 4,271,258 A) teaches away from the addition of monofunctional monomers since the addition of said monomer would deteriorate properties (col. 5 lines 30-36). Regarding the Boldt reference (US 5,536,758 A), it is the examiner's position that the art cited in the present application represents the closest prior art.

Claim Rejections - 35 USC § 102

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 1, 9-13, and 22-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Pellegri et al.

5. Pellegri teaches an improved bipolar separator for electrochemical cells, where the cells may be used in fuel cells (abstract; col. 1 lines 7-11). The separators are substantially impermeable to diffusion of hydrogen, are rigid and are protected from

discharge of anionic species (col. 2 lines 33-38). The separator plates are made by molding carbon, graphite, or metallic powder into a thermosetting resin (col. 2 lines 60-68). Insulating coatings for the separators include polyester, phenolic, furanic, and epoxide resins (col. 4 lines 44-53). The example shows a separator coated with a resin coating to a thickness of 200 μm, where the coating is cured with heat. Thus, the example shows a fuel cell plate coated with an insulative coating which is adapted to polymerize with heat. The coatings are exposed to radiation for less than about 5 seconds, since heat is used for curing instead of radiation.

6. Claims 1, 9-13, and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Breault et al.

7. Breault teaches a fuel cell assembly comprising a fibrous gas porous holder between a pair of gas impervious graphite plates (col. 2 line 64-col. 3 line 5). The reference teaches applying an adhesive to the plate and curing the adhesive with heat (col. 6 lines 58-68), where the bond provides insulation (col. 7 lines 1-14). Thus, the reference teaches providing a fuel cell plate, applying a heat-curable coating, and exposing the coating to heat. The coatings are exposed to radiation for less than about 5 seconds, since heat is used for curing instead of radiation.

Claim Rejections - 35 USC § 103

8. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

9. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pellegri et al.

10. Pellegri applies as above, teaching a coating layer of 200 μm but failing to teach a coating layer of less than about 150 μm thick. Because of the insulative properties of the coating, it is the examiner's position that it would have been prima facie obvious to apply the coating at any thickness to balance cost and insulation properties of the cell structure.

11. Claims 3, 5-8, 14-17, 19, 25-30, 33-34, and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pellegri et al. in view of Ying et al.

12. Pellegri applies as above, failing to mention coatings cured by methods other than heating. Ying discloses a protective coating for separators in electrochemical cells, where a protective coating is applied to a microporous layer (abstract). The coating may be coated and cured by heat, UV light, visible light, infrared radiation, and electron beam radiation (col. 7 lines 48-55), and the separators may be used in fuel cell applications (col. 11 lines 9-15). Ying teaches combining an ethoxylated diacrylate with a urethane acrylate and a photosensitizer, coating the mixture at a thickness of 4 microns onto a substrate, and exposing the coating to UV lamps for 30 seconds to cure (example 1). The protective coatings enhance the flexibility and toughness of the separator (col. 13 lines 60-65). Therefore, it is the examiner's position that it would have been prima facie obvious to use the protective coatings of Ying's invention in Pellegri's electrochemical cells to improve the toughness of the separators.

13. Regarding claims 19 and 36, Pellegri discloses the combination of an epoxy resin with an aromatic amine hardener for the coating composition (col. 4 lines 44-50). It is the examiner's position that one of ordinary skill in the art would envision a multi-functional monomer by the mention of an aromatic amine hardener for epoxy resins.

14. Claims 3, 5-8, 14-17, 23-30, and 33-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Breault et al. in view of Ying et al.

15. Breault applies as above, failing to mention coatings cured by methods other than heating. Ying discloses a protective coating for separators in electrochemical cells, where a protective coating is applied to a microporous layer (abstract). The coating may be coated and cured by heat, UV light, visible light, infrared radiation, and electron beam radiation (col. 7 lines 48-55), and the separators may be used in fuel cell applications (col. 11 lines 9-15). Ying teaches combining an ethoxylated diacrylate with a urethane acrylate and a photosensitizer, coating the mixture at a thickness of 4 microns onto a substrate, and exposing the coating to UV lamps for 30 seconds to cure (example 1). The protective coatings enhance the flexibility and toughness of the separator (col. 13 lines 60-65). Therefore, it is the examiner's position that it would have been prima facie obvious to use the protective coatings of Ying's invention in Breault's electrochemical cells to improve the toughness of the separators.

16. Claims 2-4, 6, 14, 17-21, 24-25, and 28-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki et al. in view of Boldt.

17. Pellegri applies as above for the coated fuel cell plate and process of coating a fuel cell plate. However, the reference does not teach the applicant's claimed steps of screen printing and exposing the plate to at least two different wavelengths. Boldt teaches a method and composition for coating a gasket with a composition for providing improved sealing characteristics and storage life (col. 4 lines 37-44; col. 2 lines 19-24), where the coatings are screen printed (col. 1 lines 41-48) and exposed to two different ultraviolet wavelengths (col. 1 lines 63-66). Examples show a total cure time of 1.5 seconds (example 1). One coating composition comprises a urethane acrylic oligomer (acrylated oligomer), isobornyl acrylate monomer (mono-functional monomer), TMPEOTA (multi-functional monomer), polydimethylsiloxane (air-release agent), and a benzophenone/1-phenyl-1-2-hydroxy-2-methyl-1-propanone photoinitiator blend (example 5). Coating thicknesses are between 0.001 and 0.020 inches (~25-500 μm, col. 9 lines 1-6). Therefore, it is the examiner's position that it would have been prima facie obvious to use the gasket coating in Pellegri's invention to improve the sealing characteristics of the fuel cell plate.

18. Additionally, the reference suggests that the curing process causes the coating to adhere to the substrate (col. 8 lines 18-33). Therefore, any additive necessary to the cure process, such as the photoinitators used in Boldt's invention, would serve to promote adhesion in the coating.

19. Claims 46-47, 52-54, and 59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shustack '387 in view of Clubley et al.

20. Shustack discloses ultraviolet radiation-curable coating precursor compositions comprising 15-75% by weight of a bulky monomer, a urethane (meth)acrylate oligomer, an epoxy (meth)acrylate oligomer, and about 0.3-10% by weight of an acidic adhesion promoter (col. 2 lines 24-47). A preferred bulky monomer is mono-functional isobornyl acrylate (col. 5 lines 58-62), and several aliphatic acrylated urethane oligomers are noted for use in the invention (col. 6 line 29-col. 7 line 16). Multi-functional monomers such as multi-functional (meth)acrylates can be included (col. 10 lines 45-53). Photoinitiators are added when UV-curing is desired in an amount of 0.3-10% by weight of the coating composition (col. 9 lines 18-30). However, the reference does not teach the use of an air release agent in the coating composition. Clubley teaches anticorrosive compositions comprising a binder material and a corrosion inhibitor, where binders include polyurethanes, acrylic resins, and epoxy resins (col. 16 lines 22-34). The coatings can be used in can coating processes (col. 17 lines 41-52), and the reference notes polydimethylsiloxane as a conventional antifoaming agent to be used in the coating (col. 18 lines 42-58). Since Shustack notes the use of conventional additives such as slip agents, smoothing agents, and wetting agents (col. 3 lines 64-68), it is the examiner's position that it would have been prima facie obvious to include an antifoaming agent such as polydimethylsiloxane in the can coatings of Shustack's invention. Motivation for including such an additive would have been to improve the antifoaming properties of the coating, thus improving appearance.

21. Also, Shustack teaches a broad range of oligomer weight composition, dependent on the desired extensibility and abrasion resistance properties (col. 6 lines 1-

28). However, the reference does not teach the applicant's specific claimed weight ratios of the components. It is the examiner's position that it would have been prima facie obvious to use the components in the applicant's claimed ranges to optimize the extensibility and abrasion resistance of the coatings.

22. Claims 49-50 and 56-57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shustack '387 in view of Clubley et al. as applied to claims 46-47, 52-54, and 59 above, and further in view of Shustack '391.

23. Shustack '387 and Clubley apply as above, noting the use of vinylic compounds such as acrylamide, vinyl pyrrolidone and other multi-functional (meth)acrylates (col. 10 lines 45-53), but failing to specify glycerol propoxy triacrylate as a multi-functional monomer. Shustack '391 teaches a similar curable coating incorporating multi-functional monomers, where the same compounds are mentioned (col. 12 lines 11-21). Additionally, Shustack '391 specifies glycerol propoxy triacrylate as a multi-functional acrylate equivalent to acrylamide or vinyl pyrrolidone in function. It is known in the art that multi-functional monomers provide cure ability in coating compositions, where curing improves cohesive strength. Because of the similarity of compositions and function, it is the examiner's position that it would have been prima facie obvious to include the multi-functional acrylate specified in Shustack '391 in the coating of Shustack '387 and Clubley to provide a coating having equally improved cure ability and cohesive strength.

24. Furthermore, Shustack '387 and Clubley do not specifically point to a photoinitiator blend of 1-phenyl-2-hydroxy-2-methyl-1-propanone and benzophenone, although benzophenone and hydroxy methyl phenyl propanone are both mentioned (col. 9 lines 18-30). Shustack '391 teaches that cleavage type photoinitiators such as hydroxymethylphenylpropanone and hydrogen abstraction-type photoinitiators such as benzophenone can be used in the invention (col. 9 line 64-col. 10 line 14), where a combination of cleavage-type and hydrogen abstraction-type photoinitiators are used to optimize surface and through cures (col. 10 lines 34-37). Thus, it would have been prima facie obvious to choose a blend of hydroxymethylphenylpropanone and benzophenone for photoinitiators to sufficiently optimize the surface and through curing of the coatings of Shustack '387 and Clubley.

25. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pellegri et al. in view of Canfield.

26. Pellegri applies as above for the process of sealing a fuel cell plate, failing to mention the application of the coating by screen printing. However, Canfield shows the conventionality of screen printing a gasket onto a fuel cell plate (Figure 6, col. 4 lines 40-51). It is the examiner's position that it would have been prima facie obvious to use a screen printing technique to apply the gasket layer of Pellegri's invention to provide a patterned discontinuous gasket layer in the expectancy of beneficial results.

Double Patenting

27. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

28. A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

29. Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

30. Claims 1-2, 5-9 and 14-16 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting over claims 1-4 of copending Application No. 09/708,965 in view of Ying et al. Although the conflicting claims are not identical, they are not patentably distinct from each other because:

31. From a prior Office action:

> 28. Copending claim 1 discloses a process for sealing and insulating a fuel cell plate comprising providing a fuel cell plate and applying an infrared radiation- or heat-polymerizable coating precursor to a surface of the plate, and exposing the coating precursor to radiation or heat to

initiate polymerization or crosslinking. However, the present claim does not specify infrared radiation or note the crosslinking of polymers; thus, it is broader than the copending claim. First, it is the examiner's position that crosslinking is a form of polymerization and thus would be encompassed by the term "polymerization". Secondly, Ying et al. applies as a reference teaching curable (polymerizable) coatings for fuel cell applications, where ultraviolet light, visible light, infrared radiation, and electron beam radiation are noted as equally beneficial energy sources for curing. Therefore, it is the examiner's position that it would have been prima facie obvious to choose polymers curable by other radiation means and to expose the polymers to other radiation sources in the expectancy of equally beneficial results. Copending claims 2-4 parallel present claims 2 and 9.

32. Note: A double patenting rejection over Application No. 09/644316 will not be made since it is believed to be abandoned.

Allowable Subject Matter

33. Claims 48 and 55 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

34. Claims 39-45 and 60-61 are allowed.

35. The following is a statement of reasons for the indication of allowable subject matter:

36. The closest prior art, Boldt (USPN 5,667,227-A), teaches a coating composition comprising a UV-curable coating for a gasket comprising a urethane acrylic oligomer, isobornyl acrylate monomer, a multi-functional monomer, a polydimethylsiloxane air release agent, and a benzophenone/1-phenyl-1-2-hydroxy-2-methyl-1-propanone

photoinitiator blend. However, the reference does not teach the use of both aliphatic acrylated urethane oligomers and epoxy acrylate oligomers or the use of adhesion promoters such as methacrylated polyols. It is the examiner's position, therefore, that the combination of methacrylated polyol adhesion promoters with the applicant's claimed coating precursor components would provide a novel, unobvious step over the prior art. It is also the examiner's position that the combination of aliphatic acrylated urethane oligomers and epoxy acrylate oligomers in a coating on a fuel cell plate would provide a novel, unobvious step over the prior art.

Response to Arguments

37. Applicant's arguments with respect to claims 1-50, 52-57, and 59-61 have been considered but are moot in view of the new ground(s) of rejection.

38. A new primary reference has been provided to teach the use of gas impermeable fuel cell plates.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melanie D. Bissett whose telephone number is (703) 308-6539. The examiner can normally be reached on M-F 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Seidleck can be reached on (703) 308-2462. The fax phone numbers for the organization where this application or proceeding is assigned are (703)

872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

mdb
May 30, 2003

James J. Seidleck
Supervisory Patent Examiner
Technology Center 1700